

VESDA VLI

Product Guide

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Part Number: 29674

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Scope

The VESDA VLI Product Guide provides a comprehensive description of the VLI detector and its accessories.

This guide introduces the VLI features, technical specifications and gives an understanding of its components and their function. You will also find instructions on installing, cabling and powering up the detector.

This guide is for anyone involved with the design, maintenance and purchasing of a VESDA system. It is assumed that anyone using this product has knowledge and the appropriate certifications from local fire and electrical authorities.

Document Conventions

The following typographic conventions are used in this document:

Convention	Description
Bold	Used to denote: emphasis Used for names of menus, menu options, toolbar buttons
<i>Italics</i>	Used to denote: references to other parts of this document or other documents. Used for the result of an action.

The following icons are used in this document:

Convention	Description
	Caution: This icon is used to indicate that there is a danger to equipment. The danger could be loss of data, physical damage, or permanent corruption of configuration details.
	Warning: This icon is used to indicate that there is a danger of electric shock. This may lead to death or permanent injury.
	Warning: This icon is used to indicate that there is a danger of inhaling dangerous substances. This may lead to death or permanent injury.

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Codes and Standards Information for Air Sampling Smoke Detection

We strongly recommend that this document is read in conjunction with the appropriate local codes and standards for smoke detection and electrical connections. This document contains generic product information and some sections may not comply with all local codes and standards. In these cases, the local codes and standards must take precedence. The information below was correct at time of printing but may now be out of date, check with your local codes, standards and listings for the current restrictions.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures; re-orientate or relocate the receiving antenna, increase the separation between the equipment and receiver, connect the equipment to a power outlet which is on a different power circuit to the receiver or consult the dealer or an experienced radio/television technician for help.

FDA

This Xtralis product incorporates a laser device and is classified as a Class 1 laser product that complies with FDA regulations 21 CFR 1040.10. The laser is housed in a sealed detector chamber and contains no serviceable parts. The laser emits invisible light and can be hazardous if viewed with the naked eye. Under no circumstances should the detector chamber be opened.

FM Hazardous Applications

3611 Hazardous Approval Warning: Exposure to some chemicals may degrade the sealing of relays used on the detector. Relays used on the detector are marked "TX2-5V", "G6S-2-5V" or "EC2-5NU".

VESDA detectors must not be connected or disconnected to a PC while the equipment is powered in an FM Division 2 hazardous (classified) location (defined by FM 3611).

FM Approved Applications

The product must be powered from VPS-100US-120, VPS-100US-220 or VPS-220 only.

ONORM F3014

ONORM F3014, transport times for all tubes (including capillaries) must not exceed 60 seconds from any hole. This means that the predesigned pipe networks that include capillaries cannot be used.

AS1603.8

The performance of this product is dependent upon the configuration of the pipe network. Any extensions or modifications to the pipe network may cause the product to stop working correctly. You must check that ASPIRE2 approves alterations before making any changes. ASPIRE2 is available from your authorized representative.

AS1851.1 2005

Maintenance Standards. Wherever this document and the AS1851.1 differ, AS1851.1 should be followed in preference to this document.

Regional Regulatory Requirements and Notices

UL

For open area protection the fire alarm threshold (signal) that initiates an evacuation procedure via the Fire Alarm Panel must not be set less sensitive than 0.625%/ft. The detector can send this signal via the Fire Alarm Panel Output signal or the Pre-alarm output signal.

Through validation testing, Underwriters Laboratories Inc. has verified that VESDA ECO gas detectors, when installed within the sample pipe network, present no significant effects on the smoke detection performance of VESDA. The use of the ASPIRE2 calculation software is required to verify system design performance with all devices included in the design.

Product Listings

- UL
- ULC

Regional approvals listings and regulatory compliance vary between product models. Refer to www.xtralis.com for the latest product approvals matrix.

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1 Introduction

The VESDA VLI is an aspirating smoke detector (ASD) that provides very early warning of fire conditions by drawing air samples through an air sampling pipe network.

The VLI detector is especially designed to operate in harsh and dirty environments. It incorporates features that specifically address the common challenges of industrial installations, including:

- high background levels of airborne particles
- the need for an IP54 rated enclosure
- detector longevity
- the need for in-field maintenance

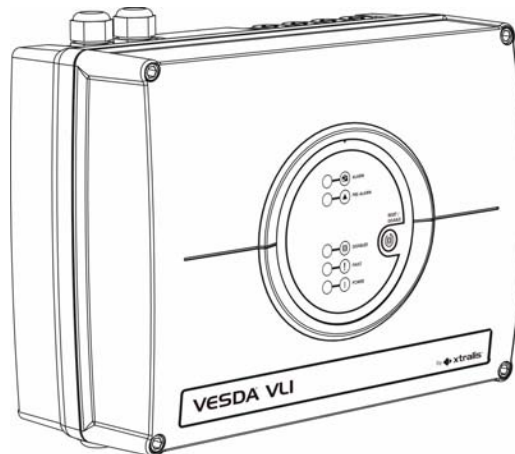


Figure 1-1: VESDA VLI Aspirating Smoke Detector

The detector easily interfaces with fire warning and fire suppression release systems, and can be integrated into a building management system (BMS).

1.1 Features

The VLI detector contains the following features:

- Area coverage up to 2000m² (21,500ft²)
- Intelligent Filter (patent pending)
- Up to four pipes, with a total pipe length of 360m (1200ft)
- Wide sensitivity range
- AutoLearn™ Smoke and Flow
- Clean Air Zero™
- Five high intensity status LEDs
- Five relays (fire, fault and three configurable) configurable as latching or non-latching
- IP54 enclosure
- Inertial separator (sub sampling probe)
- Ultrasonic individual pipe flow monitoring
- Replaceable aspirator, detection chamber and filters
- Programmable General Purpose Input (GPI)
- Local USB configuration port
- BACnet over Ethernet
- Optional expansion cards (VESDAnet with monitored GPI)
- Referencing (on VESDAnet enabled model)
- Event log for up to 18,000 events
- Easy mounting through steel support bracket
- Xtralis VSC, Xtralis VSM4 and ASPIRE2 software support

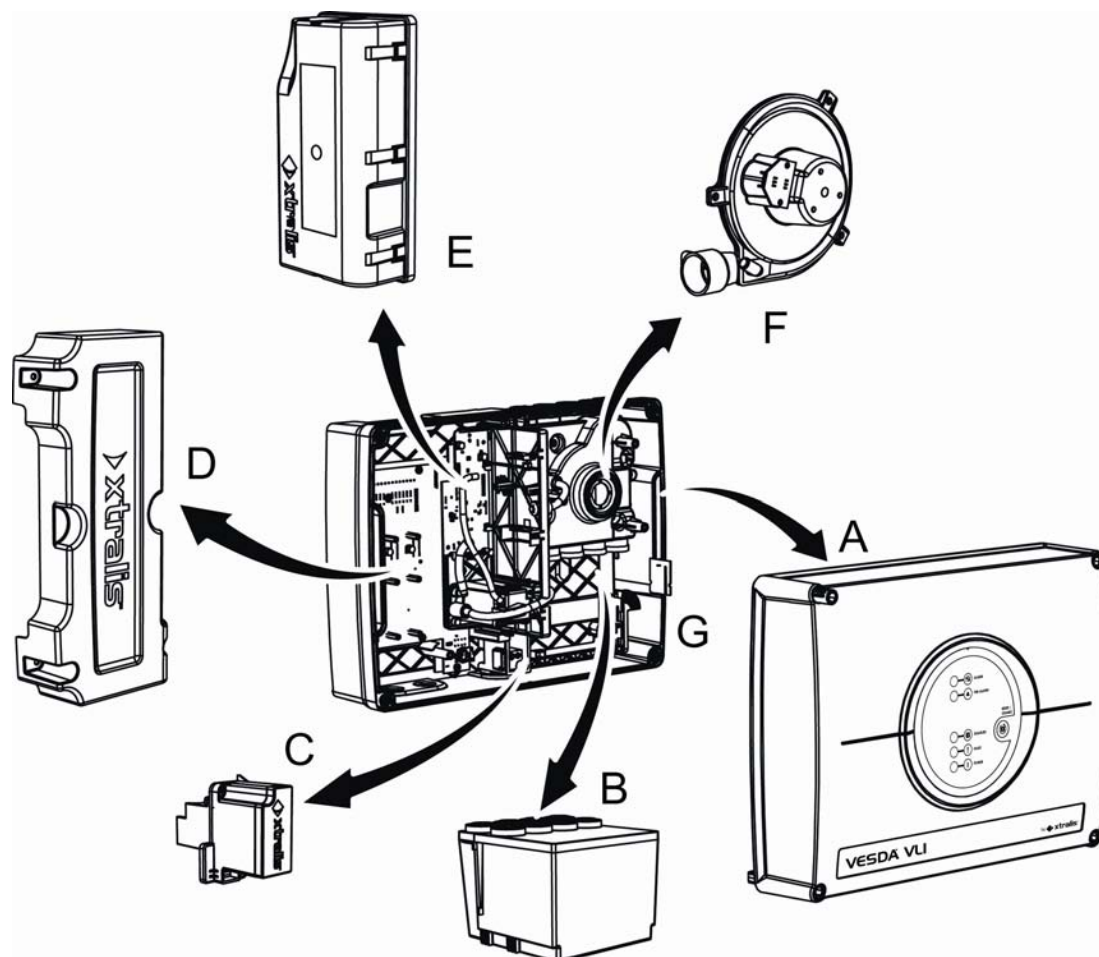
1.1.1 Intelligent Filter

The Intelligent Filter is fully monitored and provides consistent sensitivity over the entire life of the detector. The filter significantly reduces the exposure of the internals of the detector to contaminants in the incoming air while providing consistent sensitivity to smoke. Refer to section 2.2 for further information.

2 Product Information

2.1 Detector Components

The VLI detector contains a range of field-replaceable components.



Legend			
A	Front cover	E	Chamber assembly with tertiary clean air filter
B	Intelligent Filter	F	Aspirator
C	Secondary foam filter	G	Base
D	Electrostatic Discharge (ESD) cover		

Figure 2-1: Detector components

Refer to Chapter 7 for further information regarding maintenance scheduling and availability of spare parts.

2.2 How the VLI works

The VLI detector continually samples air from a protected area via a sampling pipe network (A). Upon entering the detector, the air passes four ultrasonic flow sensors (B), then through the mixer compartment of the Intelligent Filter (C), where it is split between two pathways. One pathway carries the majority of the air through the HEPA filter compartment, while the other carries a small proportion of the air through a separate ultrasonic flow sensor (D). The air recombines in the main aspirator (F).

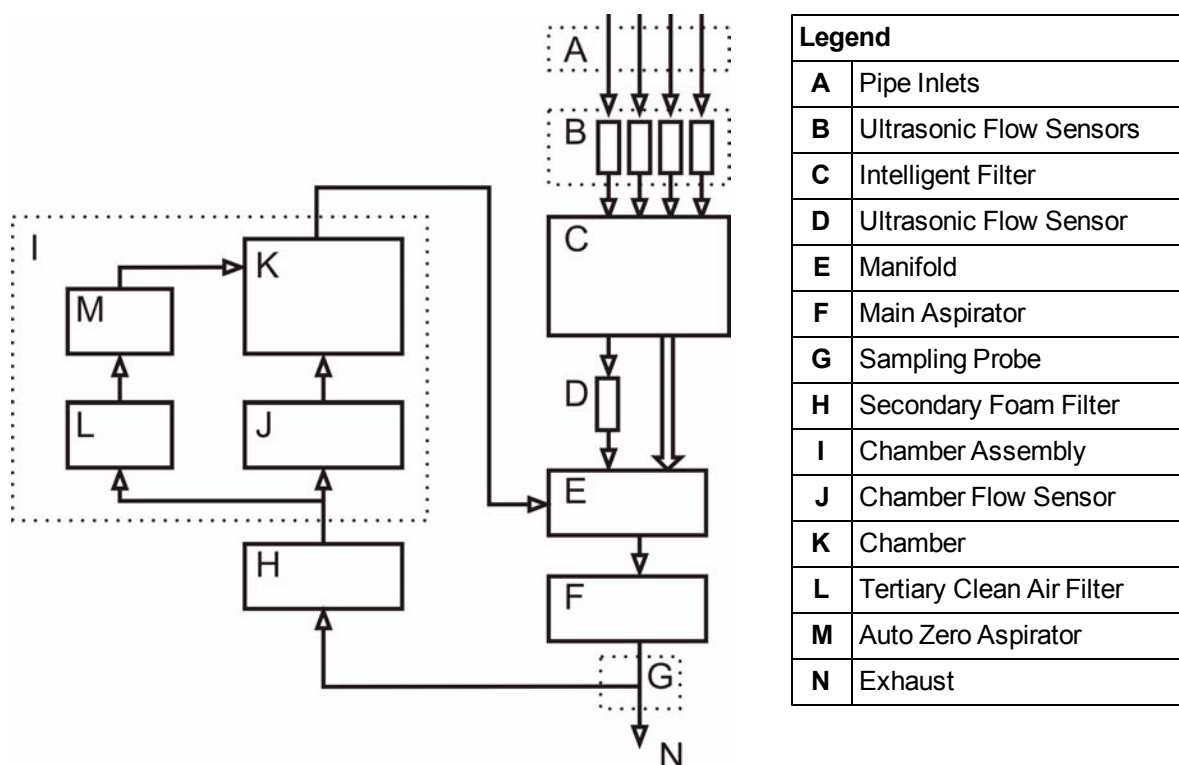


Figure 2-2: Internal airflow example

Note: The Intelligent Filter is constantly monitored for blockage using the ultrasonic flow sensor in the unfiltered path (D). The arrangement of four sets of ultrasonic flow sensors at the detector air inlets (A) and a separate ultrasonic flow sensor in the unfiltered path (D) allows the detector to measure the split of the airflow ratio as the filter load increases over time. The detector sets the sensitivity proportionally depending on flow ratio, thus ensuring consistent and reliable operation over time.

A portion of recombined air sample is then passed through a sampling probe (inertial separator) and the secondary foam filter (H) which ensures only smoke sized particles are passed into the detection chamber for analysis. The larger dust particles are unable pass through the probe and filter arrangement and hence are exhausted out of the detector (N). This eliminates nuisance alarms caused by larger dust particles and extends the life of the chamber (K). The tertiary clean air filter (L) provides air to form clean air barriers within the chamber (K), which protects the optical surfaces from contamination.

When smoke passes through the Chamber (K), it creates light scatter which is detected by the sensor circuitry. The air sample is measured, and the detector reports smoke levels adjusted according to the sensitivity ratio determined by the Flow Sensors (B and D). Air is exhausted from the detector and may be vented back into the protected area (N).

Note: The status of the detector, all alarms, service and fault events, are monitored and logged with time and date stamps. Status reporting can be transmitted via relay outputs, across VESDAnet (VN version only) or BACnet.

2.2.1 Clean Air Zero

The Clean Air Zero feature is a process that directly measures the chamber clean air smoke reading. This will reduce drift in the chamber smoke reading as caused by contamination.

The user can initiate the Clean Air Zero process using Xtralis VSC. It takes less than 60 seconds to complete, during which time the detector is offline.

Clean Air Zero Process

1. The user executes the Clean Air Zero command in Xtralis VSC.
2. The main aspirator is turned off.
3. The Clean Air Zero aspirator located inside the chamber assembly is turned on. This aspirator pumps clean air into the Chamber and purges any contaminated air.
4. After a waiting period, to allow the chamber to purge, a smoke reading is taken with clean air in the chamber. This reading is the new clean air background value.
5. The Clean Air Zero aspirator is turned off and the main aspirator is turned back on.
6. An event indicating that the Clean Air Zero process has taken place is added to the event log.

2.3 Front Panel

The VLI detector provides the following information and control capability:

- **Status LEDs:** Alarm, Pre-Alarm, Disabled, Fault and Power.
- **Controls:** Reset and Disable button.

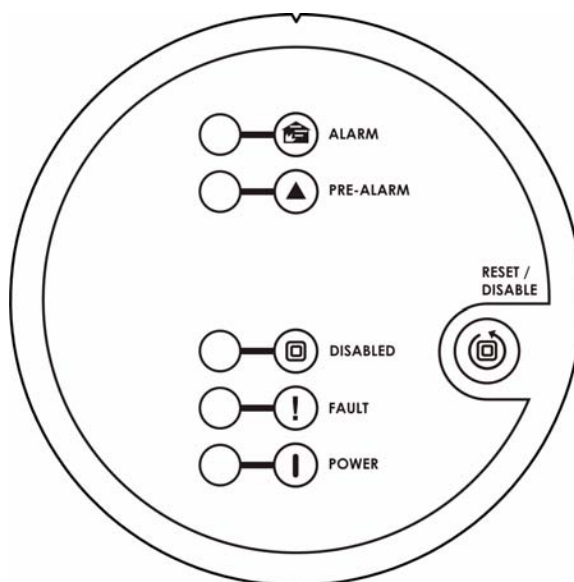


Figure 2-3: Front Panel Controls and LEDs

Status LEDs

Table 2-1: LED Indicators

LED	Description
Alarm	The Alarm LED is lit when the Fire 1 Alarm threshold is reached.
Pre-Alarm	The Pre-Alarm LED blinks when the Alert threshold is reached. The Pre-Alarm LED is lit when the Action threshold is reached.
Disabled	The Disabled lamp is lit when the detector is disabled.
Fault	The Fault LED is lit when a fault is detected, when airflow normalization is being performed or when the Clean Air Zero function is in progress. Refer to Chapter 8 for information on troubleshooting.
Power	The POWER LED illuminates when the detector is powered up.

Reset / Disable Button

- To reset the detector, press this button once.
- To disable the unit, press and hold the button for approximately 2 seconds, until the Disabled LED illuminates.
- To re-enable the unit, press and hold the button for approximately 2 seconds, until the Disabled LED deactivates.
- While the detector is disabled, any faults may be cleared by pressing this button once.

The button will not operate if:

- a remote reset switch has been fitted to the Reset (GPI) terminals and is set to the Isolate position; or
- the Reset/Disable button has been locked out in the programming.

2.4 Communication Ports

The majority of user operations are performed using software installed on a computer connected to the detector via one of the communication ports.

The communication ports are located on the main board inside the detector. It is necessary to remove the front cover from the detector in order access these ports. Refer to section 7.2 for further information.

USB

The USB port is used for configuration purposes. It allows direct connection between the VLI detector and a PC or laptop installed with Xtralis VSC. It is not necessary to install USB drivers in order for the operating system to recognize the detector.

Ethernet

The Ethernet port is used for configuration and/or monitoring purposes. It enables TCP/IP network connection between the detector and a PC or laptop installed with Xtralis VSC or Xtralis VSM4, or other BACnet protocol compatible applications.

RS485

The RS485 port is present on the VESDAnet Card on the VESDAnet enabled model, and can be used for configuration of any device on the VESDAnet. It provides connectivity for the handheld LCD Programmer or a local PC or laptop. Refer to section 2.8.1 for further information on the LCD Programmer.

2.5 Specifications

Table 2-2: VLI Detector Specifications

Specification	Value
Supply Voltage	18 to 30 VDC
Power Consumption @24 VDC	- Normal: 9.6W - Alarm on: 10.8W
Current Consumption	- Normal: 415mA - Alarm on: 440mA
Dimensions (WHD)	426.5mm x 316.5mm x 180mm (16.8 in x 12.5in x 7.1in)
Weight	TBA
Operating Conditions	Temperature: - Tested: -10° to 55°C (14°F to 131°F) - Ambient: 0° to 40°C (32° F to 104°F) - Sampled Air: -20° to 60°C (-4° to 140°F) Humidity: 10-95% RH, non-condensing
Storage Temperatures (Non-operational)	- Up to 2 years (battery life) - Dry (<95% humidity) 0° to 85°C - Must not exposed to sunlight or other radiation sources
Sampling Pipe Network	- Maximum length per pipe 120m (350ft) - Total pipe length: 360 m (1200 ft) - Pipe Modeling Design Tool: ASPIRE2™
Pipe Size	- Internal Diameter: 15-21 mm (0.874 inch) - External Diameter: 25 mm (1.05 inch)
Relays	5 relays - Fire, Fault, 3x Configurable. - Contacts rated 2A @ 30 VDC. - Programmable to latch or non-latch states - Programmable 0 - 60 sec delay for each relay
IP Rating	IP54 (protection against dust and water mist)
Mounting	Upright or inverted with supplied mounting bracket
Cable Access	4 plastic plugs (2 top, 2 bottom)
Cable Termination	Screw terminal blocks (0.2-2.5 sq mm, 30-12 AWG)
Interfaces	All Detectors: - USB (Type 2) - Ethernet (RJ45) VESDAnet enabled detectors: - RS485
Alarm Range	0.025 to 20.00% obs/m (0.008 to 6.4% obs/ft.)

Specification	Value
Threshold Setting Range	- Alert: 0.05%–1.990% obs/m (0.016% - 0.637% obs/ft) - Action: 0.1%–1.995% obs/m (0.032% - 0.638% obs/ft) - Fire1 : 0.15 %–2.0% obs/m (0.048% - 0.64% obs/ft) - Fire2: 0.155 %–20.0% obs/m (0.05% - 6.4% obs/ft) ** Limited to 12% obs/m (4% obs/ft.) in UL mode
Referencing	Reference smoke level source for VESDAnet enabled detectors.

Notes:

All shipments are factory configured for UL Mode. If the UL Mode is switched OFF the UL listing will be voided.

- UL Mode = ON: Fire set to 12% obs/m (4% obs/ft.) to comply with UL268
- UL Mode = OFF: Fire threshold can be set up to 20% obs/m (6.4%/ft)

Table 2-3: Key Software Features

Event Log	Up to 18,000 events stored on FIFO basis
AutoLearn	- Minimum 15 minutes - Maximum 15 days, 23 hrs, 59 minutes - Recommended minimum period 14 days Thresholds are automatically changed from the previously set values to the updated values after the AutoLearn process has completed.
Referencing	Adjustment for external ambient conditions
Four Alarm Levels	Alert, Action (Pre-Alarm), Fire1 (Alarm) and Fire2
Two Fault Warning Levels	Minor Fault and Urgent Fault
Maintenance Aids	- Filter and flow monitoring - Event reporting via VESDAnet, BACnet and event log

Table 2-4: Ordering Information

VESDA VLI without VESDAnet Card	VLI-880
VESDA VLI with VESDAnet Card	VLI-885
Handheld LCD Programmer	VHH-100
Remote LCD Programmer Module	VRT-100
Remote Display Module	VRT-200
Remote VESDAnet Socket Module	VRT-300
Remote Processor Only Module With 7 relays	VRT-500
Remote Display Without Relays	VRT-600

Note: Refer to section 7.7 for the spare parts list.

2.6 Dimensions

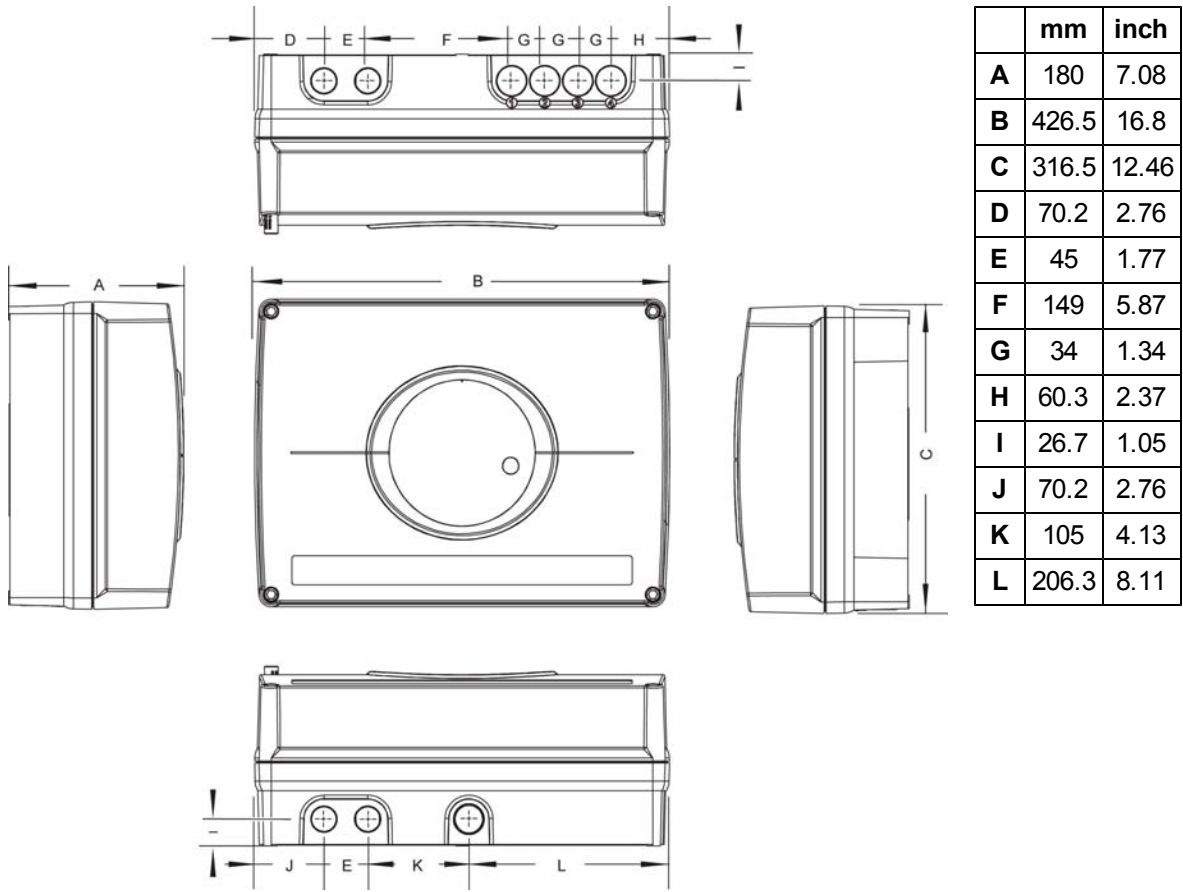


Figure 2-4: Front Dimensions

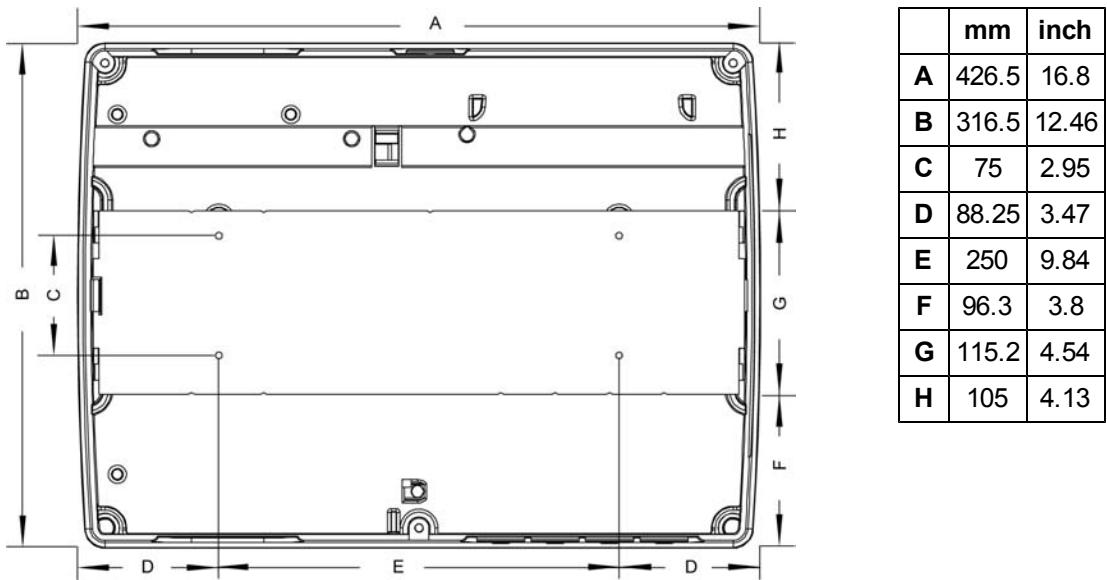


Figure 2-5: Rear Dimensions

2.7 Expansion Cards

A range of optional expansion cards that enhance the capabilities of the VLI detector can be fitted.

2.7.1 VESDAnet Card

VESDAnet is a proprietary communications protocol which is used on a network that connects the VESDA range of smoke detectors, displays, programmers and remote units and enables them to communicate.

A VESDAnet network allows:

- configuration and monitoring of devices from a central computer.
- connection to a reference detector.
- connection to additional accessories such as remote displays.

The VESDAnet enabled VLI detector (VLI-885) can join a VESDAnet network when the optional VESDAnet expansion card is installed.

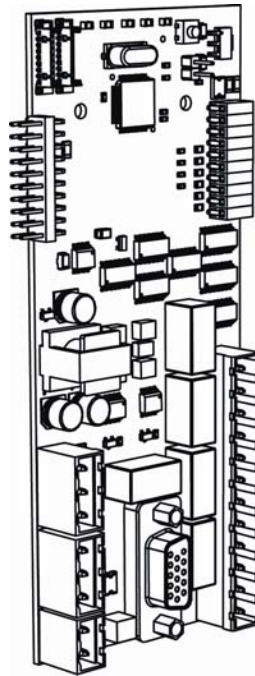


Figure 2-6: VLI VESDAnet Card

The VLI VESDAnet Card also includes a 15-pin socket for directly connecting a hand-held LCD Programmer (refer to section 2.8.1) or a High Level Interface (HLI), and a socket for monitored General Purpose Input (refer to section 3.2.5).

Refer to the VESDA Communications Guide for further information on VESDAnet network connectivity.

2.8 Accessories

A range of optional accessories are available to augment the VLI detector.

2.8.1 LCD Programmer

The VESDA LCD Programmer is used for configuring, commissioning and maintenance of the devices on VESDAnet. It is connected via VESDAnet and can be mounted at a remote location.

A hand-held model (VHH-100) is also available. This model is connected to a DB9 socket on the optional VESDAnet expansion card (refer to section 2.7.1).

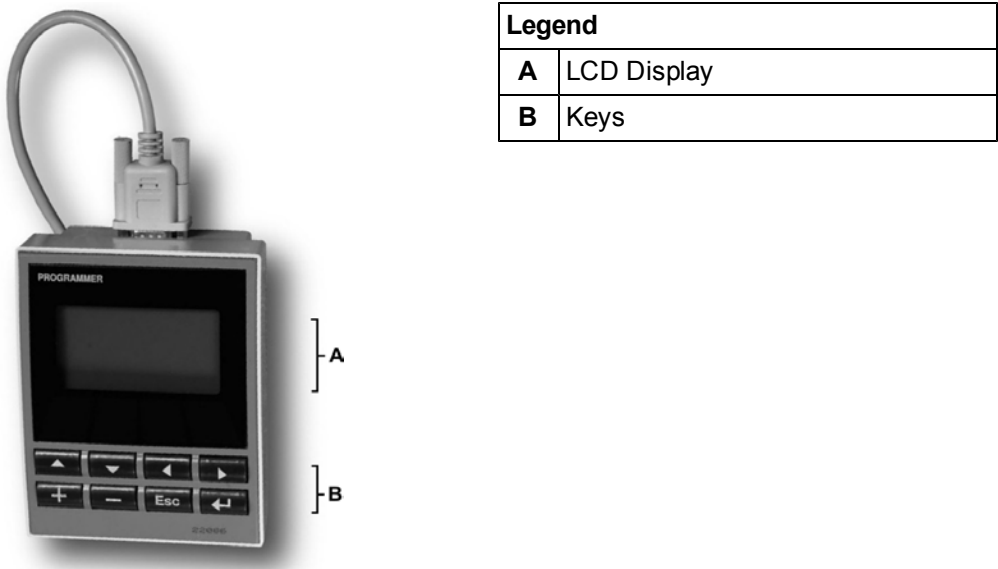


Figure 2-7: Hand-held LCD Programmer

Refer to the LCD Programmer Product Guide for further details.

2.8.2 Remote Display Module

The Remote Display Module provides real-time indication of the status of a VLI detector and a single zone.



Figure 2-8: Remote Display Module

The unit contains a 20-segment vertical bar graph display, a 2 digit numeric display, an audible sounder, clear alarm and fault indicators, and can be mounted in a remote mounting box or 19 inch subrack.

- Smoke levels are continuously shown on the bar graph display where each illuminated segment indicates the current level of detected smoke.
- The top segment of the bar graph indicates the Fire 1 smoke threshold level and each segment below that level represents 1/20 of the Fire 1 smoke threshold level.
- The Fire 1, Action and Alert smoke threshold indicators provide a visual representation of the programmable alarm thresholds, showing how close the smoke level is to triggering the next level of alarm.
- Fault conditions are indicated by a series of LEDs and an audible tone.
- The numerical readout can show either the current smoke level in % obscuration/m (% obscuration/ft) or the Fire 1 threshold in % obscuration/m (% obscuration/ft).
- Four buttons enable users to reset, isolate or silence the detector and control the mode of the remote display module. These buttons can be locked out.

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3 Installation

The VLI detector is shipped with all the components necessary for installation with the exception of pipe and associated materials.

Components include:

- 1 VLI detector
- 1 Mounting bracket.
- 1 End of Line resistor with units factory fitted with VESDAnet Card
- Multilingual Installation Sheet
- this Product Guide

Check all components for damage and refer any concerns to your authorized representative.

Additional Requirements

Depending on the nature of the installation, it may be necessary to acquire the following items:

- Screws and inserts for the mounting bracket appropriate for the installation location
- USB Interface Lead if configuration of the detector is to be done via the USB interface



Figure 3-1: Type A to Type B USB Interface Lead

3.1 Mounting

The VLI detector can be mounted in an upright or inverted position. Do not mount the detector with a sideways orientation as shown in Figure 3-2 below.

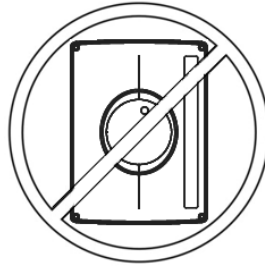


Figure 3-2: Sideways orientation

Ensure the mounting surface is flat. This will permit an air tight seal to be achieved between the sampling pipe and the tapered air ports on the detector.

Ensure that there is sufficient clearance to mount the detector, noting the location of air sampling pipes and cable entry points. Due to the rigid nature of the plastic pipe, installation must provide for sufficient movement in all pipework (air inlet, air exhaust and cable pipes) to allow pipe ends to be easily fitted and removed.

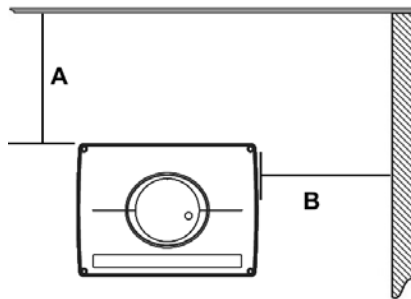


Figure 3-3: Mounting location

Mount the Detector

1. Horizontally align the mounting bracket (A) and place the flat side flush against the surface. Use appropriate fasteners (B) to secure the bracket.

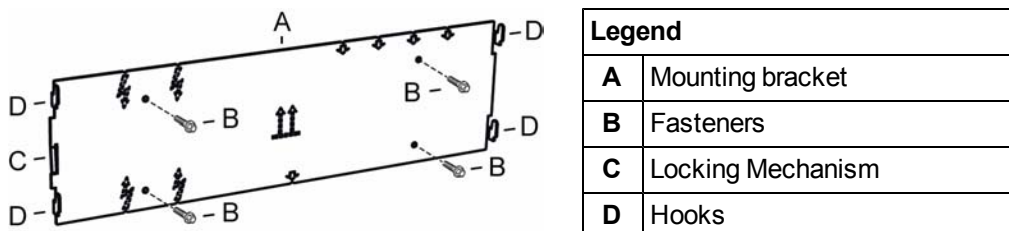


Figure 3-4: Mounting Bracket

2. Ensure that the locking mechanism (C) is bent outwards, as shown below in Figure 3-5.
3. Place the four slots located at the rear of the detector onto the hooks (D) of the mounting bracket.
4. Slide the unit downwards onto the hooks (D) until the locking mechanism (C) clicks.

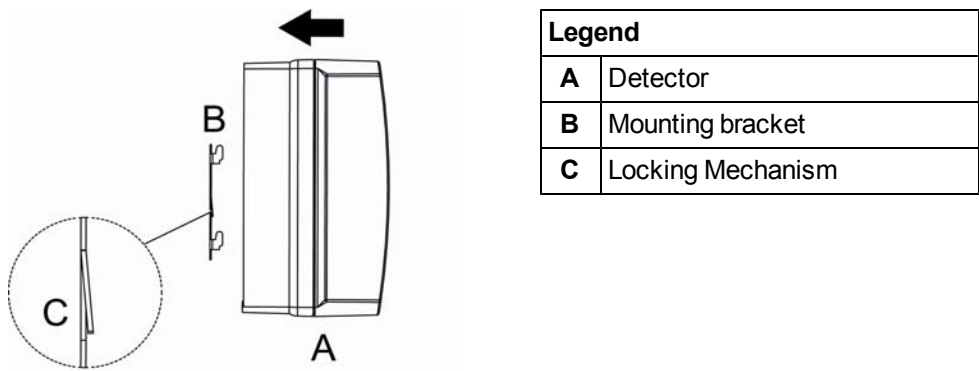


Figure 3-5: Mounting the detector

3.2 Wiring

The screw type terminals located on electrical terminals within the VLI detector will accept wire sizes from 0.2 mm² to 2.5 mm² (30 – 12 AWG).

Refer to Codes and Standards Information for Air Sampling Smoke Detection on page iii for code specific requirements.

Refer to the VESDA System Design Manual for cabling details.



Caution: Electrostatic discharge (ESD) precautions need to be taken prior to removing the front cover from the detector in order to prevent damage to sensitive electrical components within the VLI.

3.2.1 Power Source

There are two sets of power terminals on the main board. Connect to a 24 VDC power supply to the PWR IN socket, and if required loop out to another detector via the PWR OUT socket.

The detector will not operate if the power supply polarity is reversed.



Caution: Operating the detector when DC supply voltage is outside the specified voltage range may cause damage to internal components. For further information refer to the Product Specifications on page 10.

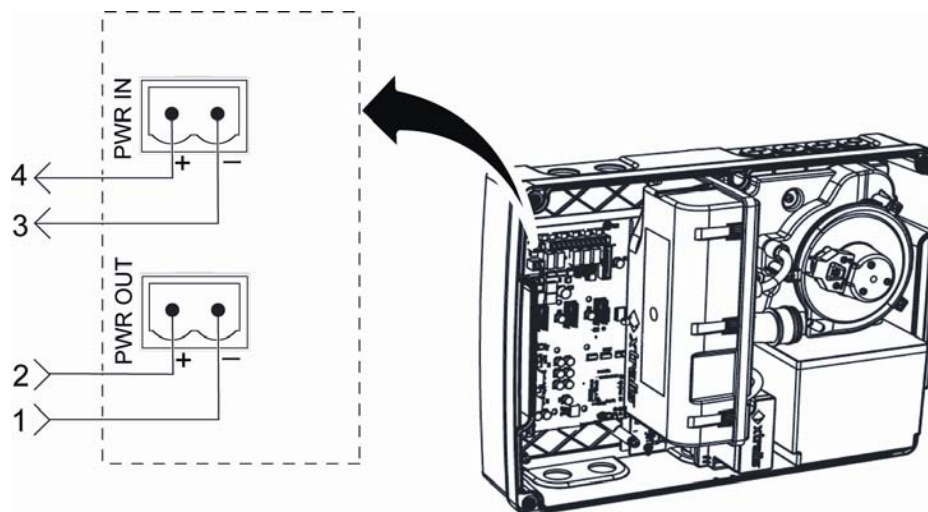


Figure 3-6: Wire connection details for power terminals

Power to Multiple Detectors

Up to 8 detectors may be daisy chained to the same power supply by connecting the PWR OUT power passthrough socket to the PWR IN socket on each subsequent detector.

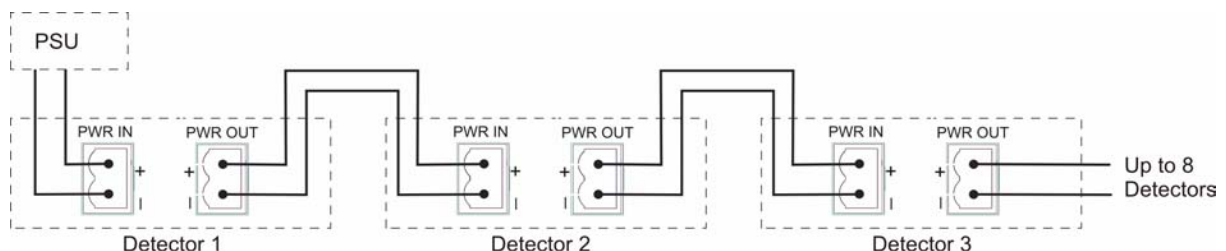


Figure 3-7: Multiple Detectors powered by a single power supply

Compliance

It is recommended that the power supply be compliant with local codes and standards required by the regional authority. For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

3.2.2 VESDAnet

VESDAnet is a bidirectional data communication network between connected VESDA devices. VESDAnet connectivity is available on the VESDAnet enabled VLI detector (VLI-885). Refer to section 2.7.1 for further information.

It is recommended that RS 485 (Belden 9841 - 120 Ohm) twisted pair cables, or similar cables be used for including the devices in the network.

The network cables are terminated at the VESDAnet A and B Terminals on the VESDAnet card. Cabling from one VESDA device is brought into the detector at one terminal and looped out to another device on VESDAnet from the other terminal.

Notes:

- Connection between devices should be from A to B. Avoid using A to A or B to B.
- The polarity of the data wires must be maintained throughout the network.

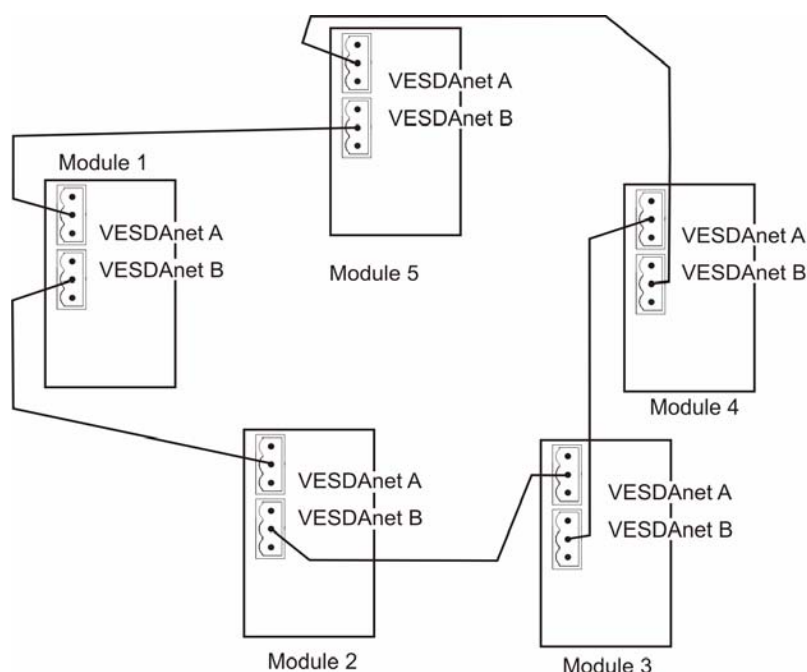


Figure 3-8: Example closed loop VESDAnet network

The VLI-885 detector is shipped with the VESDAnet A and B terminals looped. Remove this loop prior to connecting the detector to the VESDAnet. If the detector is not to be networked with other devices, then do not remove this loop.

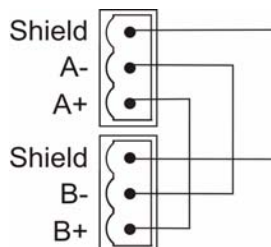


Figure 3-9: Closed loop for standalone detectors with VESDAnet capability

Note: Refer to the VESDA Communications Guide for further information.

3.2.3 Relays

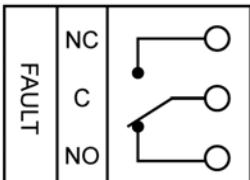
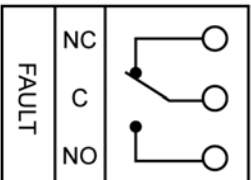
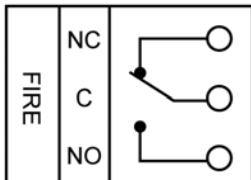
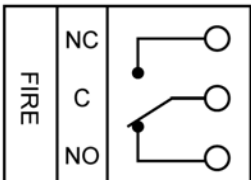
The relays, located on the main processor card, interface to Fire Alarm Control Panels (FACP) to communicate faults, alarms and isolate states.

Fault and Fire1 Relay Terminals

Fault (Trouble) and Fire1 (Alarm) relay terminals are located on the main board inside the detector.

The Fault relay is energized during normal operation while the Fire relay is only energized when a Fire is detected. The operation of the relays are summarized in the following table.

Table 3-1: Fault and Fire Relay Operation

FAULT Relay		FIRE Relay	
Normal Operation (Energized)	Fault or unpowered state	Normal Operation (De-energized)	Fire
			

Programmable Relays

The three additional relays can be programmed using Xtralis VSC software or the LCD Programmer. Refer to the Xtralis VSC Online Help or LCD Programmer Product Guide for details.

3.2.4 Unmonitored General Purpose Input (GPI)

The GPI is a programmable input which can be configured to initiate a number of different actions - including, by default, a Remote Reset function.

Notes

- When the detector is isolated or de-isolated via the GPI, the status cannot be changed through the normal isolate/de-isolate functions of the Display Module or the LCD Programmer.
- When the night-time thresholds are invoked via the GPI, it overrides the clock settings for day-start and night-start.

The GPI requires a voltage supply between 5V and 30 VDC from the connected device in order to operate. The input is isolated from the system by an opto-coupler device.

3.2.5 Monitored General Purpose Input (GPI) Wiring

Monitored GPI is available in units fitted with the VESDAnet card. It can be used to monitor the detector power supply.

With monitored GPI, the detector monitors the GPI for open or short circuit faults when the GPI function is set to any value except None.

When the GPI function parameter is set to external, the detector indicates an external equipment fault condition by monitoring the line impedance. An End of Line (EOL) resistor is supplied with the product and must be assembled in parallel with the device to be monitored.

The EOL resistor provides a known termination to the external equipment, this allows the VLI detector to identify open or short circuits.

3.2.6 Typical Wiring to Fire Alarm Control Panel (FACP)

The diagram below shows the correct way to wire VESDA detectors to a conventional fire alarm control panel (FACP). It also shows where an End Of Line (EOL) resistor is correctly installed.

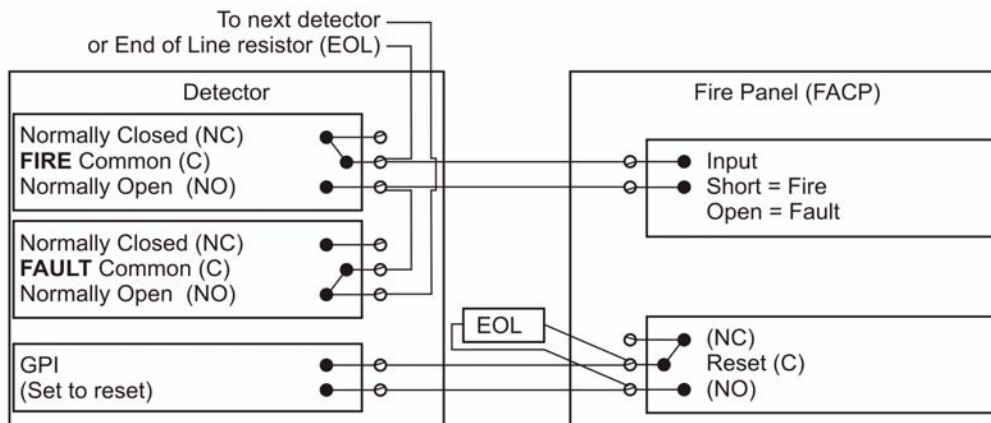


Figure 3-10: Typical wiring to a fire panel with EOL

3.2.7 Typical Wiring to Address Loop Module

This wiring example is for wiring VESDA detectors to a typical Input/Output Loop module 3 inputs 1 output. These are example drawings. Refer to the appropriate product manual for the exact wiring details of the third party equipment.

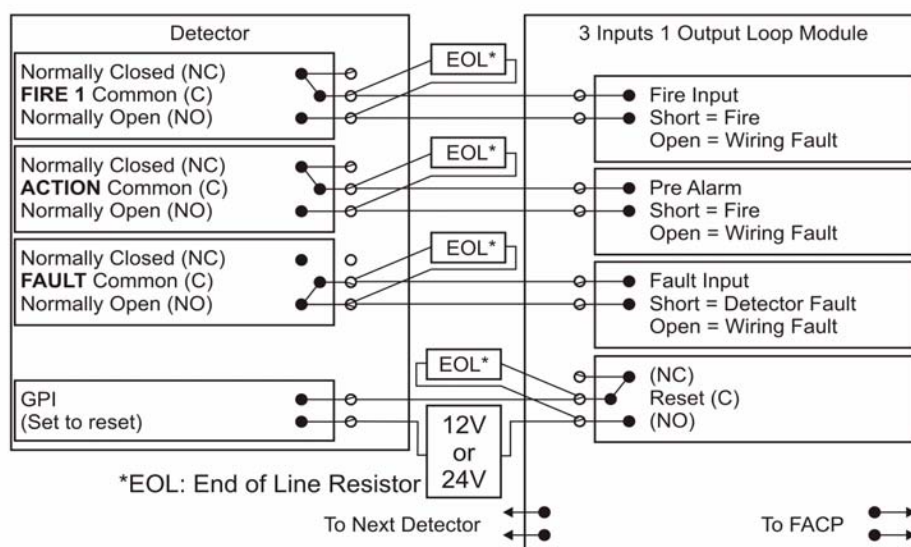


Figure 3-11: Input/Output Loop Module with EOL

3.2.8 Specify Backup Battery

In the event of a mains power supply disruption, the VLI detector runs on a backup battery. The size of the battery is determined by:

- local codes and standards
- the total power required by the system
- back up time required
- allowance for reduction in capacity with age
- expected temperature variations

Note: It is recommended that batteries be inspected and changed as per manufacturer's specifications or as per local codes and standards.

To facilitate the calculation of the backup battery size, a Battery Calculation Sheet is included below.

Table 3-2: Calculating the size of backup battery

Equipment	Normal loads @ 24 V DC			Full alarm load @ 24 V DC		
	Load mA	Qty	Total	Load mA	Qty	Total
Detector	340			390		
Remote Display	90			110		
Remote Programmer	50 (backlight off)			110 (backlight on)		
Hand-held Programmer	50 (backlight off)			110 (backlight on)		
System Relay Module	60			105		
Other 24V Loads		Total mA			Total mA	
			X			X
	Standby Hours			Alarm Hours		
			=			
	Standby Capacity			Alarm Capacity		
				Total Capacity = Standby + Alarm		
				Divided by 1000 for Standby Capacity		
				Multiply by battery factor X1.25		

Note: If monitored GPI terminals are connected to the power supply and configured for external fault, the aspirator speed will be maintained for one hour after the loss of mains power, after which the aspirator speed will be limited to 3000 rpm to conserve power.

3.3 Powering Up

After installing the detector it is necessary to power up the system. This takes approximately 15 seconds.

The VLI detector is an "always on" device which is activated by applying powered cabling to the power input terminal on the main board. This process must only be performed by Xtralis accredited personnel.

If the system fails to power up, check all power wires are secured to their terminals and the polarities of the power wires are correctly terminated.

On power up:

- The Power LED illuminates.
- The aspirator starts up and air is felt flowing out of the exhaust port
- If there is a fault, the Fault LED illuminates.

It is normal for the detector to display troubles immediately after the first power up. Reset the detector by pressing the reset button on the front cover of the detector to unlatch the relays and fault LED. Any remaining faults will cause the Fault LED to illuminate. Proceed with the preliminary system check.

3.4 Configuration

The VLI detector can be configured using Xtralis VSC software installed on a direct or network connected PC.

3.4.1 Default Settings

Table 3-3: Default Settings

Parameter	Default Values	Range		Access Level
		Minimum	Maximum	
Event Log - Events				
• Smoke Level	Enabled	n/a	n/a	Adm
• Alarms	Enabled	n/a	n/a	Adm
• Faults	Enabled	n/a	n/a	Adm
• User Action	Enabled	n/a	n/a	Adm
Thresholds				
• Alert	0.2% obs/m (0.064% obs/ft)	0.05% obs/m (0.016% obs/ft)	1.990% obs/m (0.637% obs/ft)	Adm
• Action (Pre-Alarm)	0.3% obs/m (0.096% obs/ft)	0.1% obs/m (0.032% obs/ft)	1.995% obs/m (0.638% obs/ft)	Adm
• Fire1 (Alarm)	0.4% obs/m (0.128% obs/ft)	0.15% obs/m (0.048% obs/ft)	2.0% obs/m (0.64% obs/ft)	Adm
• Fire2	2.0% obs/m (0.64% obs/ft)	0.155% obs/m (0.05% obs/ft)	20.0% obs/m (6.4% obs/ft**)	Adm
Alarm Delays	10 Seconds	0 Seconds	60 Seconds	Adm
Delay Times	Simultaneous	Simultaneous	Cumulative	Adm
Instant Fire	Disabled	Enabled	Disabled	Adm
Change-over Times: • Day • Night	• 07:00:00 • 19:00:00	Two Seconds	11:59:58	Adm
Weekend	Saturday & Sunday	Adjust to suit environment	Adjust to suit environment	Adm
Holidays • First Day • Last Day	• 1-Jan-90 • 1-Jan-90	Adjust to suit environment	Adjust to suit environment	Adm
Smoke Change: • Change by: • Min. Interval	• 0.02% obs/m (0.006%obs/ft.) • 2 seconds	• 0.02% obs/m (0.006% obs/ft.) • 2 seconds	• 0.2% obs/m (0.064%obs/ft.) • 10 seconds	Adm
AutoLearn	14 days 0 hours 0 minutes	0 days 0 hours 15 minutes	15 days 23 hours 59 minutes	Adm

** In default "UL mode", maximum sensitivity is limited to 4%/ft

Parameter	Default Values	Range		Access Level
		Minimum	Maximum	
Air flow Thresholds: • High Urgent • High Minor • Low Minor • Low Urgent • Delay	• 150% • 130% • 70% • 50% • 0 seconds	• 105% • 105% • 25% • 25% • 0 seconds	• 200% • 200% • 95% • 95% • 60 seconds	Adm
Secondary Filter Service Interval	1460 days (4 years)	1 Day	3655 days (10 years)	Adm
UL Version	On	Selectable	Selectable	Adm
VESDAnet enabled detectors				
Reference detector: • Zone No. • Reference • Dilution Delay	• 255 • 100% • 2 minutes	• Selectable • 1% • 0 minutes	• Selectable • 100% • 15 minutes	Adm
Communications: • Network Delay • Preferred Port • Health Check • Open - ended	• 15 seconds • A • 45 seconds • None	• 10 seconds • n/a • 40 seconds • n/a	• 45 seconds • n/a • 60 seconds • n/a	DST

3.4.2 Relay Assignments and Conditions to Change States

Relays 1 and 2 are fixed to Fire1 (Alarm) and Fault respectively.

Relays 3, 4 and 5 are fully configurable. For example, relay 3 could be configured to Alert, Fire2 or Minor Fault.

Table 3-4: Relay assignments and conditions to change state

Relay #	Default	State changes	Latch
1	Fire1 (Alarm)	Energizes when an alarm is initiated.	Unlatched
2	Fault	De-energizes when a fault is detected.	Latched
3,4,5	n/a	Configurable	Configurable

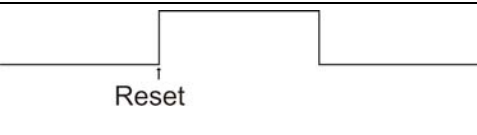
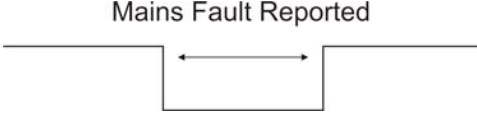
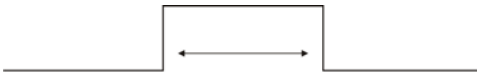
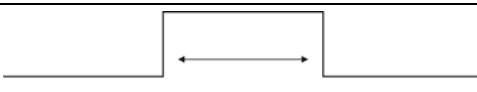
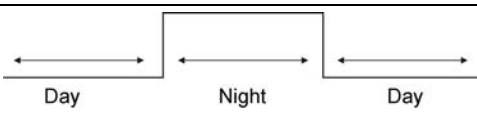
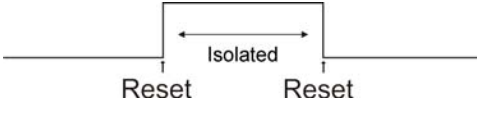
3.4.3 Unmonitored General Purpose Input (GPI) Functions

The unmonitored GPI can be configured to initiate a number of different actions - including, by default, a Remote Reset function.

The GPI can be configured through Xtralis VSC or through the 'Miscellaneous' screen menu of the LCD programmer. Refer to the Xtralis VSC Online Help or LCD Programmer Product Guide for further details.

Refer to section 3.2.4 for further information on GPI wiring.

Table 3-5: GPI Functions

Function	State Change	
External Reset	Detector Reset when ≥ 5 VDC is at this terminal.	
Mains OK	The detector monitors the state of the external power supply and responds to the following conditions. - Mains OK ≥ 5 VDC at this terminal. - Mains Fail ≤ 2 VDC at this terminal.	
Standby Mode	The detector Isolates and the aspirator turns OFF when ≥ 5 VDC is at this terminal. Note: No Alarms can be generated in this state	
Isolate	The detector isolates when the voltage rises above 5 VDC and de-isolates when the voltage falls below 5V.	
Use Night-time Threshold	The detector switches over from day-time to night-time thresholds when ≥ 5 VDC are at these terminals.	
Reset + Isolate	While power is applied to the GPI the detector is isolated. In addition, the disconnection or connection of power to the GPI resets the unit. ≥ 5 VDC detector isolates. ≤ 2 VDC detector reset.	
Inverted Reset	This is the reverse of the normal reset function. ≤ 2 VDC detector reset. ≥ 5 VDC normal operating mode.	

Notes:

- The signal voltage into the GPI terminals must be between 5 to 30 VDC.
- When the detector is isolated, de-isolated or set to standby as a GPI function, the status cannot be changed through the normal isolate/de-isolate/standby functions of the Display Module or the LCD Programmer.
- When the night-time threshold is configured as a GPI function, it overrides the clock settings for day-start and night-start.

When using the standby or remote isolate options it is recommended that all displays on VESDAnet are configured to have the Isolate button locked out. When programming the display through the LCD Programmer choose Isolate Disabled from the Button Lockout menu.

3.5 Installation Checklist

Site Name	
Address	
Detector Serial Number(s) and Date of Manufacture	
Name of Installer	
Signature	
Date	

Perform the following checks listed below to ensure that all the necessary items are completed before handing over to a commissioning engineer.

Installation Checks	Yes	No
Were the detector and the mounting bracket intact in the box?		
Is the detector securely locked onto its mounting bracket?		
Are the sampling air pipes firmly connected to the air inlet ports? Ensure that the pipes are <u>NOT</u> glued.		
Have the power wires been connected to the correct terminals on the detector?		
If required, has the end of line resistor been connected?		
Have the alarm and fault signaling wires been terminated to the correct terminals of the detector?		
Has the plug at the exhaust port been removed? Ensure that the exhaust pipe (if fitted) is <u>NOT</u> glued.		
Has the front cover been fitted correctly?		
Is the air sampling pipework installed and checked as per the site plans?		
Are the VESDAnet terminals looped back on a standalone VESDAnet enabled detector? Refer to section 3.2.2.		
Is the Intelligent Filter installed and its lever locked down?		
Is the secondary foam filter installed?		

Table 3-6: Installation Checklist

3.6 Preliminary System Check

A preliminary system check is required after installing the VLI detector, before it is commissioned for use. The check can be conducted by connecting the detector to a LCD Programmer or using the Xtralis VSC software. The preliminary systems check includes:

- For networked detectors, conducting a communications check .
- Configure the "pipes in use" setting.
- Normalizing the air flow.
- Conducting a basic pass/fail smoke test.

For details on preliminary systems check refer to the LCD Programmer or the relevant software documentation.

Refer to the LCD Programmer and Commissioning Guides for further details.

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4 Pipe Network Design

The Pipe Network should be designed by trained personnel, and verified using the ASPIRE2 software.

4.1 Design Considerations

The following points should be considered when designing a pipe network for the VLI detector:

- The detector requires a minimum total airflow of 40 liters per minute, and a minimum of 20 liters per minute per pipe.

Refer to the VESDA Pipe Network Design Guide for best design practices.

4.2 Installation Considerations

The following points should be considered when installing sampling pipe:

- minimize flexing in sampling pipes by supporting the pipe every 1.5m (5ft) or less, or at a distance described in local codes and standards.
- evenly arrange the sampling pipe network over return air grilles.
- sampling pipe fits firmly into the tapered detector port, DO NOT glue this connection.
- allow sufficient movement at the detector to permit pipe removal for maintenance.
- keep the exhaust pipe as short as possible to minimize airflow resistance in the pipe.
- pipe ends must be made smooth for bonding.
- sampling holes must be drilled in line and perpendicular to the pipe.
- sample holes must be clear of rough edges and debris.
- pipes are free of debris.
- all joints must be bonded except the endcaps and pipes entering the detector.

Notes:

- In protected areas sampling holes should face into the direction of airflow, or point downwards in static airflow situations.
- Keep the sampling holes evenly spaced.
- For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

Refer to the Pipe Network Installation Guide for best installation practices.

4.3 Inlet Pipes

The VLI detector supports up to four sampling pipes.

The inlets in the pipe inlet manifold are tapered such that they receive both 25 mm (1 in) or IPS 3/4 inch outer diameter pipes.

Each air inlet port allows maximum insertion of the sampling pipe to a depth of 15 mm. (0.60 in). This prevents the sampling pipes from damaging the flow sensors. While connecting the detector to the pipe network:

- Ensure a minimum length of 500mm (19.7in) of straight pipe before terminating the pipes at the air inlet ports of the detector.
- Square off and de-burr the end of the sampling air pipes, ensuring the pipes are free from debris.
- Determine the Air Inlet Ports to be used. Refer to Table 4-1 below for details.
- Remove the plugs from only those Air Inlet Ports intended for use.
- Insert the pipes into the pipe inlet(s) ensuring a firm fit.

Note: DO NOT glue the inlet pipes to the pipe inlet manifold.

When configuring the detector ensure that the correct pipes in use are selected:

Table 4-1: Preferred use of pipe inlet ports

No. of Pipes	Preferred Pipe Inlet Port to use			
	Pipe 1	Pipe 2	Pipe 3	Pipe 4
1		Inlet 2 or 3	Inlet 2 or 3	
2		✓	✓	
3	Inlet 1 or 4	✓	✓	Inlet 1 or 4
4	✓	✓	✓	✓

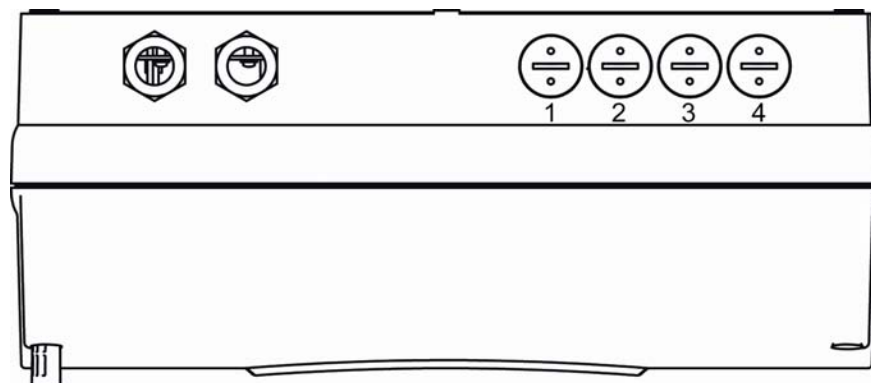


Figure 4-1: Pipe inlet port numbering

For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

4.4 Managing the Exhaust Air

Air is expelled from the detector via the exhaust port at the bottom of the unit enclosure.

The air exhaust port is tapered to accept standard pipes of OD 25 mm (ID 21 mm) or IPS ¾ inch and to provide an airtight seal. Remove the exhaust port plug and if required, connect an outlet pipe to the exhaust manifold. DO NOT glue this pipe to the exhaust manifold as this will void the warranty.

Where the detector is located outside the protected area, it may be necessary to return the exhaust air to the protected environment. For example, where pressure differences exceed 50 Pa, or where hazardous substances are present inside the protected area. Return air pipes need to be as short as possible to minimize the effect of airflow resistance in the return air pipe network.

5 Operation

Once the VLI detector has been commissioned, it will report alarms and faults according to the parameters defined during installation.

The procedures below describe how to define a connection to the detector within Xtralis VSC.

5.1 Connecting to the Detector

Xtralis VSC supports connecting to a VLI detector via a range of connection mechanisms and communication protocols. Connection methods are defined and saved for future use within the Connection Manager.

To define a connection to a networked or standalone VLI detector, follow this procedure:

1. Select **Connection | Manager** from the menu system.
The Connection Manager dialog is displayed.

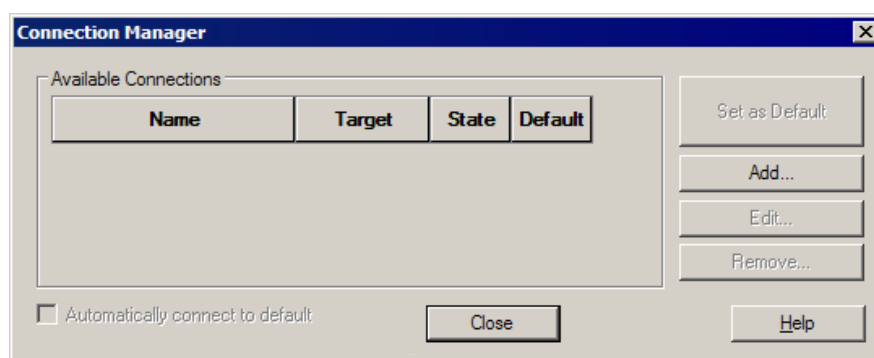


Figure 5-1: Connection Manager

2. Select **Add**.
The Add Connection dialog is displayed.

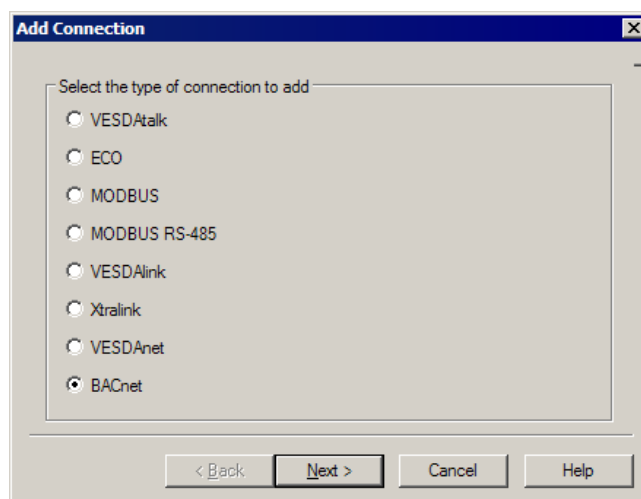


Figure 5-2: Add Connection

3. Select the BACnet connection option, then select **Next**.

5.1.1 Creating a USB Connection

1. Open the VLI detector and connect the USB cable from the USB socket on the main board inside to a PC or laptop located near the detector with the Xtralis VSC software installed. Refer to Chapter 7 for further information on opening the detector.
2. Follow the steps in section 5.1.
3. Select BACnet from the Add Connection dialog box (Figure 5-2).
4. Select USB, then select Next (Figure 5-3).
5. Select the detector type from the list of available detectors, then select Next.
6. Enter a unique BACnet Device ID, then select Next.
7. Enter a unique name for the device, then select Finish.

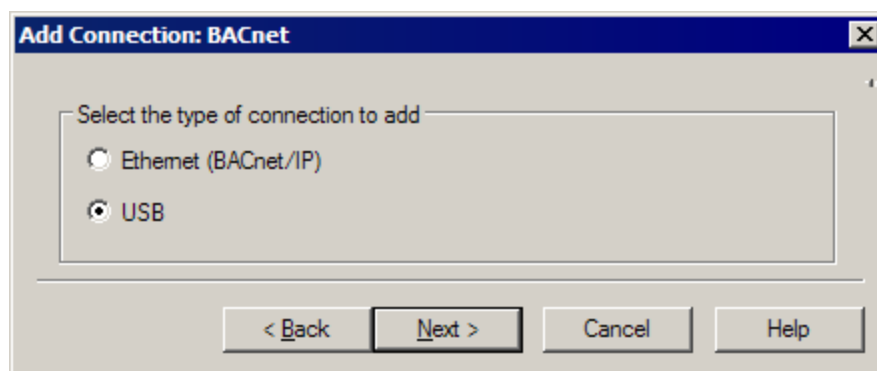


Figure 5-3: Select USB

5.1.2 Creating an Ethernet (BACnet/IP) Connection

1. Follow the steps in section 5.1.
2. Select BACnet from the Add Connection dialog box (Figure 5-2).
3. Select Ethernet (BACnet/IP), then select Next (Figure 5-4).
4. Enter a unique IP address, then select Next. If the detector is being connected to a corporate network, this address may need to be provided by the network administrator.
5. Enter a unique BACnet Device ID, then select Next.
6. Enter a unique name for the device, then select Finish.

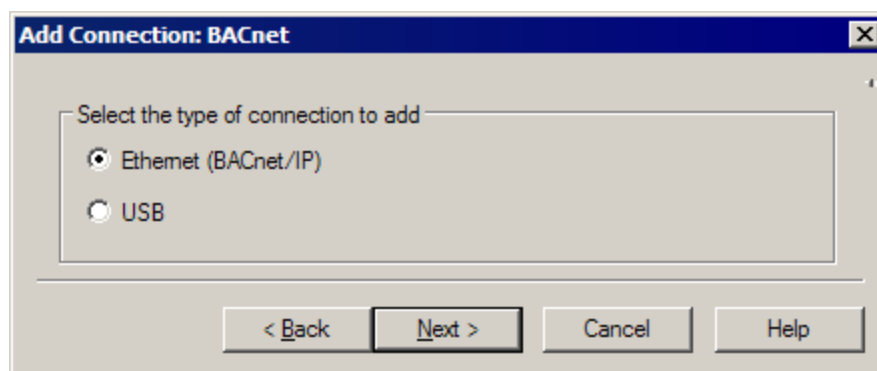


Figure 5-4: Select Ethernet (BACnet/IP)

Note: For specific information relating to network configuration, refer to the VESDA Communications Guide.

5.1.3 Creating a VESDAnet Connection

1. Follow the steps in section 5.1.
2. Select VESDAnet from the Add Connection dialog box (Figure 5-2).
3. Select the COM port associated with the High Level Interface (HLI) and click on the Next button.
4. Enter the name you want to identify the connection with in the Name field and click on the Finish button.

Note: For specific information relating to VESDAnet configuration, refer to the VESDA Communications Guide.

5.2 Access Levels

When accessing the VLI detector via Xtralis VSC or LCD Programmer, there are three user levels; DST, ADM and USER. It is necessary to log in using a four digit PIN code.

User Level	Access Level	Functional Authorization
USR	Low	This is the USER or the OPERATOR level. The user can view the event log, change the date and the time. They can also perform selected zone control functions.
ADM	High	At the ADMINISTRATOR level access is available to most functions. These include setting alarm thresholds, normalizing air flows, reset filter, and defining the relay configuration.
DST	Absolute	The DISTRIBUTOR level allows unlimited access to all the system commands and parameters.

Table 5-1: User Access Levels

The default PIN for each level of user is set at the factory. The distributor has access to the PINs for each level. PIN numbers are disclosed to authorized personnel attending accredited training courses.

After logging in the user has the option to change the default PIN. To guard against unauthorized access, if someone enters an incorrect PIN number three times they will not be allowed another attempt for ten minutes

5.3 Commands

The following commands are able to be issued to the detector:

Command	Description	Execute From	
		Detector	VSC
Return to Factory Defaults	Restores the configuration of the detector to the initial factory default values.		✓
Accept Factory Defaults	Applies the factory default settings to the detector.		✓
Disable	Disables all the output relays associated with the detector.	✓	✓
Standby	Turns off the aspirator and stops all signaling.	✓	✓
Enable	Enables all the output relays associated with the detector.	✓	✓
Reset	Unlatches all latched alarms and faults, and returns relays to their normal state. Reset does not apply to the Isolate condition.	✓	✓
Normalize Air Flow	Starts the air flow normalization process for the selected detector. The normalization process determines the reference flow rate. The detector can be in normal or disabled mode, but not standby mode. While the aspirator is turned off during the process, the detector will not register smoke levels from the protected environment. A fault will be generated if the process fails.		✓
Start AutoLearn Smoke	In Xtralis VSC you will be prompted to set the period of time that the environment is monitored to allow the system to decide what smoke thresholds are most appropriate. It is recommended to set the smoke thresholds a little higher than expected before starting the AutoLearn to prevent any unnecessary triggering of alarms. When the AutoLearn has finished, the levels are overwritten.		✓
Cancel AutoLearn Smoke	Cancel the AutoLearn Smoke process. Smoke thresholds will remain at levels set prior to commencing AutoLearn Smoke.		✓
Reset Aspirator	Reset the smoke hours for the aspirator.		✓
Reset Intelligent Filter	Reset the Intelligent Filter status information after installing a replacement.		✓
Reset Secondary Foam Filter	Reset the Secondary Foam Filter status information after installing a replacement.		✓
Rebuild Zone List	Send a command to detectors on the same VESDAnet for them to rebuild the list of display modules that are assigned to each detector.		✓
Clear Event Log	Remove all entries from the Event Log.		✓

Command	Description	Execute From	
		Detector	VSC
Start Fault Test	Generate a fault on the detector and de-energizes the fault relay (Relay 2).		✓
Start Alarm Test	Simulate full scale smoke level and initiates all alarm activity. Alarm relays will energize unless isolated.		✓
Start Air Flow Fault Test	Test the air flow sensing system by shutting down the aspirator for 30 seconds.		✓
Relay Test	Test the available relays.		✓
View Current Air Flow	View the current airflow.		✓
Monitor Filter	Display filter status.		✓
Clean Air Zero	Measure chamber background. Note: This command will shut down the aspirator for up to a minute.		✓

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6 Commissioning

The VLI has been designed to simplify commissioning processes. The AutoLearn function allows the unit to assess its environment and setup appropriate alarm and flow thresholds.

The detector is programmed using Xtralis VSC software or LCD Programmer via VESDAnet.

Note: Detectors should be commissioned with a smoke test.

Prior to commissioning the detector, check:

1. That the power is connected and on.
2. That the pipe network is clean and correctly fitted with all joints correctly seated and sealed (except the endcaps and the pipe which enters the detector which must not be glued).

It is important that the protected area is working under normal operating conditions when operating the AutoLearn processes.

For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

6.1 AutoLearn Smoke

AutoLearn Smoke is initiated within Xtralis VSC or the LCD Programmer.

During the AutoLearn Smoke process, the detector determines the average smoke and peak smoke obscuration levels and sets suitable alarm thresholds for the operating environment. This process will minimize nuisance alarms due to normal environment smoke variations.

During the learning cycle, alarm conditions can be reported. If an alarm condition occurs, AutoLearn will not complete its cycle. In this situation the user must restart the AutoLearn process. If AutoLearn is halted, the alarm thresholds will be left at the previous settings.

Conditions experienced during learning are assumed to be representative of normal operating conditions.

The AutoLearn Smoke learning times range from above 15 minutes to 15 days, with the default being set to 14 days.

If AutoLearn is running during the changeover period from Day to Night Thresholds, make sure that AutoLearn runs for at least an hour in both the Day and Night periods.

Table 6-1: AutoLearn Smoke range

Alarm Level	AutoLearn Smoke Range
Alert	0.025%–1.990% obs/m (0.008% - 0.637% obs/ft)
Action (Pre-Alarm)	0.025%–1.995% obs/m (0.008% - 0.638% obs/ft)
Fire1 (Alarm)	0.025 %–2.0% obs/m (0.008% - 0.64% obs/ft)
Fire2	0.025 %–20.0% obs/m (0.008% - 6.4% obs/ft)

For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

6.2 AutoLearn Flow

AutoLearn Flow process is initiated within Xtralis VSC.

During the AutoLearn Flow process, the detector determines the average and peak air flow levels monitored over time and sets suitable air flow thresholds that will not give rise to nuisance flow faults due to normal flow variations (such as might arise through air-conditioning related nuisance faults). The system will normalize the flow and then monitor the flow trend to set the flow fault thresholds.

During the learning cycle, flow faults can be reported. If a flow fault is reached, AutoLearn will not complete its cycle. In this situation the user must restart the AutoLearn process. If AutoLearn is halted, the flow thresholds will be left at the previous settings.

Conditions experienced during learning are assumed to be representative of normal operating conditions.

The AutoLearn Flow learning times range from 15 minutes to 15 days, with the default being set to 14 days.

6.3 Commissioning Smoke Test

It is recommended that a smoke test be carried out to prove the integrity of the pipe network, to demonstrate that the system is working and to measure the transport time to the detector.

This test involves introducing a smoke sample at the furthest sampling hole and then measuring the time taken for the smoke to travel to the detector. Results are logged and compared to subsequent tests to note variations of the system.

Refer to the VESDA Commissioning Guide for details of the commissioning smoke test.

7 Maintenance

To maintain the VLI detector at its peak performance level, the recommended maintenance schedule shown in Table 7-1 below should be followed.

Table 7-1: Recommended maintenance schedule for the VLI detector

Maintenance Check	Quarterly	Six Monthly	Annual	Biennial	Quadrennial
Power Supply	✓				
Check Pipe Network		✓			
Pipe Integrity Smoke Test			✓		
Check Pipe Flow			✓		
Clean Sampling Point			✓		
Flush Pipe Network			✓		
Replace Intelligent Filter				✓	
Replace Secondary Foam Filter					✓

Notes:

- Maintenance can be conducted by the original installer or an authorized distributor or service contractor.
- The required frequency of maintenance checks may vary depending upon local codes and standards and the environment of the installation.



Caution: While the detector or zone is isolated, no fire warnings will be annunciated by the detector. Prior to any maintenance or testing:

- Inform appropriate supervising authority about the risk associated with isolating a detector or zone.
- Check to see if the detector is also being used by a third party.
- Ensure that any ancillary devices dependent on the detector are isolated before work commences.

7.1 Set the Detector to Standby

To set the detector to standby, press and hold the Reset / Disable button for 2 seconds. The Disabled LED will illuminate and the aspirator will turn off.

To re-activate the unit, press and hold the button for 2 seconds.

While the detector is in standby mode, any faults may be cleared by pressing this button once.

The button will not operate if:

- a remote reset switch has been fitted to the Reset (GPI) terminals and is set to the Isolate position; or
- the Reset/Disable button has been locked out in the programming.

7.2 Remove the Front Cover

Several maintenance functions require that the front cover be removed from the VLI detector in order to perform them. The front cover is held on by four captive screws. It may be removed by turning the screws counter-clockwise.



Caution: Electrostatic discharge (ESD) precautions need to be taken prior to removing the front cover from the detector in order to prevent damage to sensitive electrical components within the VLI detector.

Remove the Front Cover

The front cover is held on by four captive screws and a tether. It may be removed by turning the screws counter-clockwise.

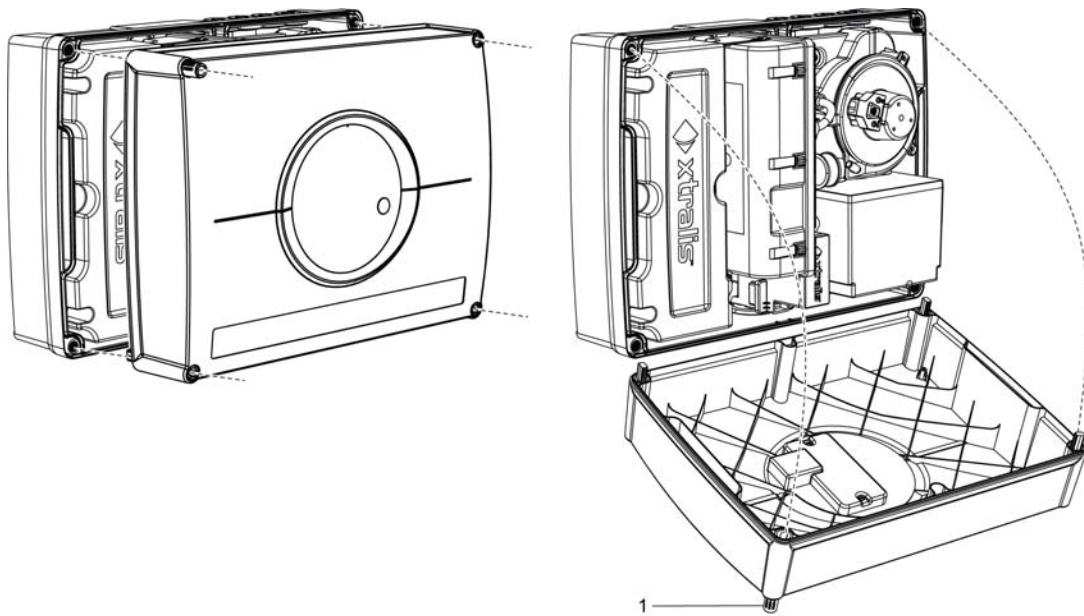


Figure 7-1: Front cover removal

7.3 Replacing the Intelligent Filter

The detector constantly monitors the difference between the flow of filtered air and the flow of un-filtered air into the manifold. The flow of filtered air decreases when compared to the flow of un-filtered air as dirt and other particles accumulate in the Intelligent Filter. Although it is recommended to replace the Intelligent Filter every two years, environmental conditions dictate the actual frequency of Intelligent Filter replacement.

The detector displays a fault condition that requires replacement of the Intelligent Filter when the flow of filtered air falls below the minimum threshold when compared to the flow of un-filtered air.

Remove the Intelligent Filter

1. Set the detector to Standby mode. Refer to section 7.1 for further information.
2. Remove the front cover. Refer to section 7.2 for further information.
3. Unclip the Intelligent Filter (A) by pulling the locking lever outward (B).
4. Remove the Intelligent Filter.

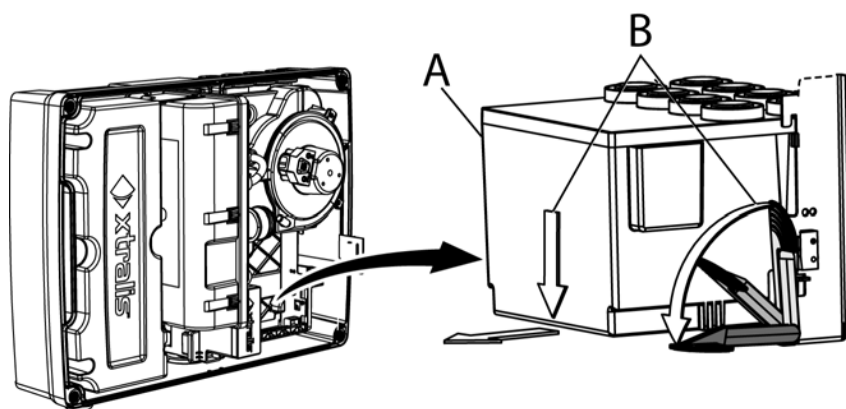


Figure 7-2: Intelligent Filter Removal

Reinstall the Intelligent Filter

1. Position the Intelligent Filter inside the detector, aligning the locking tabs (A) to the slots (B).
2. Push the locking lever in the direction of arrow (C) until it clicks into the locked position and the Intelligent Filter Present Switch (D) is actuated.
3. Execute the "Reset Intelligent Filter Life" command using Xtralis VSC. Refer to section 5.3 for further information on this command.

Note: Do not reinstall a used filter.

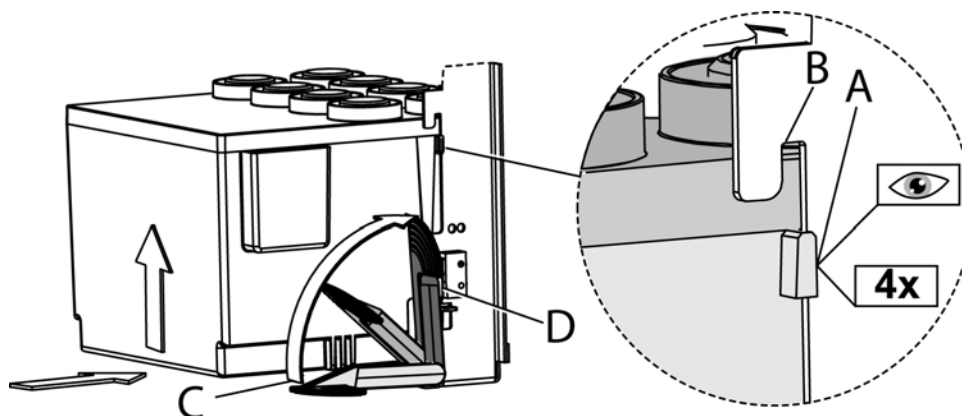


Figure 7-3: Intelligent Filter Installation

7.4 Replacing the Secondary Foam Filter

To maintain the operational integrity of the detector, it is recommended that the secondary foam filter be replaced every 2 years, or when a filter fault occurs or more often for environments that experience high levels of contamination.

When the secondary foam filter needs to be replaced, a fault is raised on the detector. During the replacement process the detector needs to be informed that a new filter has been installed.

Remove the Secondary Foam Filter

1. Set the detector to Standby mode. Refer to section 7.1 for further information.
2. Remove the front cover. Refer to section 7.2 for further information.
3. Remove two secondary foam filter screws (A).
4. Remove the secondary foam filter (B).

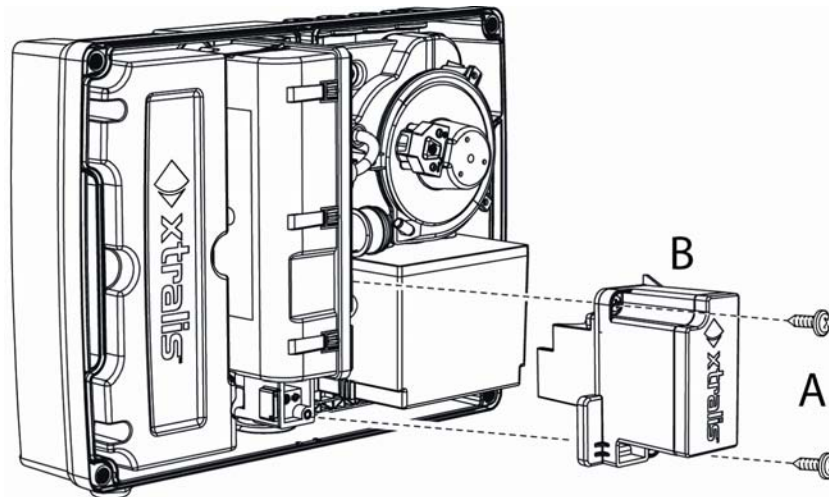


Figure 7-4: Secondary Foam Filter Replacement

Reinstall the Secondary Foam Filter

To reinstall the Secondary Foam Filter, follow the removal procedure in reverse order and execute the Reset Filter command in Xtralis VSC.

Note: Do not reinstall a used filter.

7.5 Replacing the Aspirator

Any time the aspirator is removed ensure the area surrounding the aspirator is clear of dirt and debris prior to replacement.

Care must be taken during aspirator replacement. The aspirator must be correctly seated; this is essential so that gaskets are not damaged or dislodged from the underside of the aspirator.

Remove the Aspirator

1. Set the detector to Standby mode. Refer to section 7.1 for further information.
2. Remove the front cover. Refer to section 7.2 for further information.
3. Power down the detector.
4. Unplug the Aspirator electrical connector.
5. Remove the three Aspirator screws (A) and the two screws on the exhaust port (B).
6. Remove the Aspirator (C).

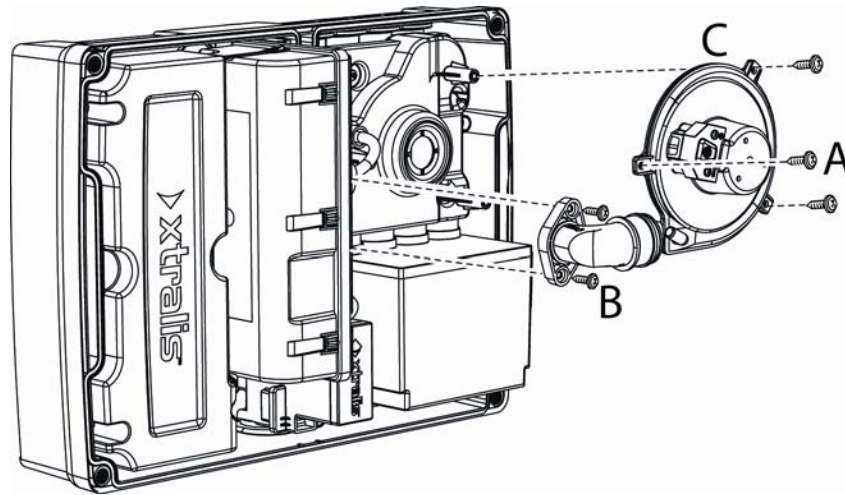


Figure 7-5: Aspirator Replacement

Reinstall the Aspirator

To reinstall the Aspirator, follow the removal procedure in reverse order.

7.6 Replacing the Chamber Assembly

Remove the Chamber Assembly

1. Set the detector to Standby mode. Refer to section 7.1 for further information.
2. Remove the front cover. Refer to section 7.2 for further information.
3. Power down the detector.
4. Remove the three ESD Cover screws (Figure 7-6A).
5. Remove the ESD Cover (Figure 7-6B).

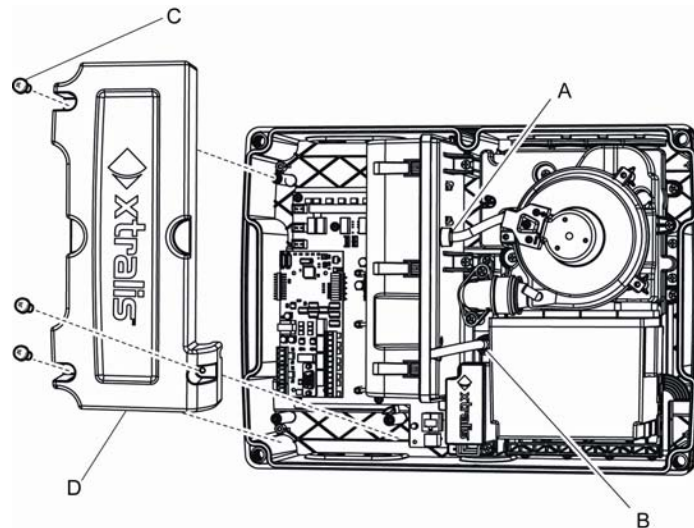


Figure 7-6: Chamber Assembly Replacement - ESD Cover

4. Disconnect the cable.
5. Remove the two chamber assembly screws (Figure 7-7: A).
6. Disconnect the air inlet (Figure 7-6) and the exhaust tube (Figure 7-6D) while sliding the chamber out.
7. Remove the chamber assembly (Figure 7-7: B).

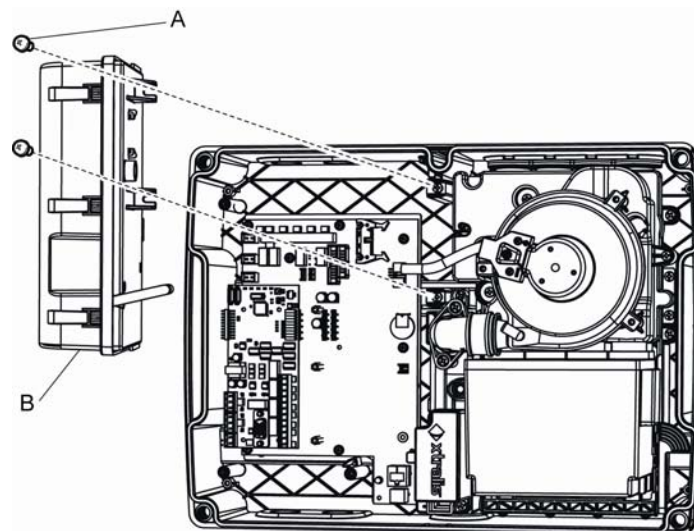


Figure 7-7: Chamber Assembly Replacement - Chamber Assembly

Reinstall the Chamber Assembly

To reinstall the Chamber Assembly, follow the removal procedure in reverse order.

7.7 Spare Parts

Gray-colored internal components such as the Intelligent Filter and Aspirator are field-replaceable.

Part No.	Description
VSP-030	VLI Intelligent Filter
VSP-031	VLI Secondary Foam Filter
VSP-032	VLI Aspirator
VSP-033	VLI Chamber Assembly

Table 7-2: Suggested spare parts stock

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8 Troubleshooting

If the VLI detector identifies a fault condition, the Fault LED on the front of the detector illuminates and an event containing details of the condition is written to the event log.

Tools such as the LCD Programmer or the Xtralis VSC software must be used to obtain specific information on the event to enable further investigation and correction of the fault. The Xtralis VSC Online Help contains descriptions of each fault and recommended corrective actions.

Additionally, if a Remote Display unit is connected to the detector, the specific fault type will be indicated on the Remote Display. The fault types shown on the display are listed below in Table 8-1.

Table 8-1: Fault Types indicated by the Remote Display

Fault Type	Description
Urgent	A serious fault requiring immediate attention.
System	A fault affecting the network.
Zone	A Zone fault in the display module.
Power	If the monitored GPI Function is used, and this LED is lit it indicates a fault in the power supply,
Network	A communications fault on VESDAnet.
Airflow	Higher or lower than acceptable levels of air flow through the inlet pipe.
Filter	An air filter requires changing.

Note: It is normal for a new system to indicate airflow faults. These are rectified as part of the setup and commissioning process.

8.1 Troubleshooting with Xtralis VSC

The Xtralis VSC software displays faults in the active event list as they occur. The list displays the date and time of the fault, the serial number of the device on which the fault has occurred, the zone number, fault number, and a description of the fault.

For detailed information about a fault, access the device tree menu, highlight the device, and select device information. This will display the details of the fault.

The fault is removed from the active event list once the it is cleared.

8.2 Troubleshooting with an LCD Programmer

The LCD Programmer reports individual device faults. The faults are reported in the status screen and are clearly identified with a “F” icon against the fault. Details of the faults can be interrogated through the “status” option of the respective device.

For further details please refer to the LCD Programmer Product Guide.

8.3 Fault Reporting Through Relays

VESDA devices are often interfaced with Fire Alarm Control Panels (FACPs) or building management systems (BMS) and may not be connected to display modules. In such instances the fault relays signal the fault to the FACP or the BMS which then reports the fault. It would be necessary to use an LCD Programmer or Xtralis VSC software to further investigate the fault.

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A Commissioning Forms

This is the main commissioning form for each customer site.

Table A-1: VESDA commissioning form

Customer Name	
Site Address	
Installer (Name & Contact)	
Commissioner (Name & Contact)	

Checks	Date:
1. Wiring Checked 2. Detector Diagnostics 3. Display Diagnostics 4. Test Relay	1. 2. 3. 4.

Client Representative Name	
1. Test witnessed by:	Date:

Hand Over Documents	
1. Copy of this form 2. ASPIRE2 Installation Data Pack 3. ASPIRE2 Bill of Materials 4. Commissioning form or printout from Xtralis VSC for each detector 5. Commissioning form or printout from Xtralis VSC for each display module 6. Smoke test results 7. Forms required for compliance with local codes and standards	

Customer's Signature	Date:
Commissioner's Signature	Date:

A.1 VLI Detector Commissioning Form

For all VESDAnet systems, highlight the device, the zone or VESDAnet then select **File > Print to file**.

Table A-2: VLI Detector commissioning form

Address (Zone)					
VESDA Zone Name					
Module Type	VLI-				
Firmware Version					
Card Inserted	VESDAnet Interface Card or Multi-relay card or None				

Alarm Thresholds			Significant Smoke		
Day	Action (Pre-Alarm)		Instant Fire	Enable / disable	
	Fire1 (Alarm)		Secondary Foam Filter	Service Period:	
Day/Night Changeover	Enable / Disable		Reference Detector	Address Zone:	
	Day starts:			Dilution%	
	Night starts:			Delay (seconds)	
Night	Action (Pre-Alarm)		Flow Threshold	High Major%	
	Fire1 (Alarm)			High Minor%	
Delay	Action (Pre-Alarm)			Low Minor%	
	Fire1 (Alarm)			Low Major%	
				Delay (seconds) Networked	
				Flow Averaging Period (sec) Networked	
			Airflow		
			Raw Flow		L/min
			% Flow		%
			Maximum Transport Time observed		sec.

A.2 Display/Relay Configuration

Table A-3: Display/Relay Configuration commissioning form

Button Lockout	Enabled/Disabled
Smoke Test	
Reset	
Isolate	
AutoLearn Smoke	
AutoLearn Flow	
Relays Connected	Yes/No
GPI Connected	Yes/No
GPI Function	

A.3 Relay Configuration

Table A-4: Relay Configuration commissioning form

Relay	1	2	3	4	5	Start-up	Latching
Fault	✓						
Fire		✓					
Configurable			✓				
Configurable				✓			
Configurable					✓		

D= Normally De-energized; E= Normally Energized

A.4 VESDAnet Interface Card

Table A-5: VESDAnet Interface Card commissioning form

VESDAnet Card Installed	Yes/No
Card Serial Number	
Preferred Port	Port A/Port B
Loop Open Ended on this card	Yes/No

A.5 ASPIRE2 Data

Table A-6: ASPIRE2 Data commissioning form

	Group 1	Group 2	Group 3	Group 4
Aggregate Sensitivity				
Balance				
Suction Pressure (least)				
Endcap Sensitivity Factor				
Pipe Flow Rate (L/min)				

A.6 Smoke Test

Table A-7: Smoke Test commissioning form

Test Results	
Test Method	
Type of Smoke	
Test Date	

A.7 Air Sampling Test Results

Table A-8: Air Sampling Test results commissioning form

		Pipe 1	Pipe 2	Pipe 3	Pipe 4
	Transport Time from End Cap Hole				
Test 1	Initial Response				
	Action (Pre-Alarm)				
	Fire1 (Alarm)				
	Peak Smoke				
Test 2	Initial Response				
	Action (Pre-Alarm)				
	Fire1 (Alarm)				
	Peak Smoke				

B Glossary

A	Aspirator	Impeller type fan used to draw sampled air into the detector.
	AutoLearn Smoke	A feature which allows the detector to learn about its environment (background pollution, differences between day and night operations within the facility etc) in order to set appropriate alarm thresholds for that environment.
	AutoLearn Flow	A feature which allows the detector to learn about its environment (airflow patterns, differences between day and night operations within the facility etc) in order to set appropriate airflow thresholds for that environment.
B	BACnet	The data communications protocol used on the Ethernet port.
C	Capillary Tubes	Flexible tubes attached to the sampling pipe network for sampling specific areas or objects away from the sampling pipe.
	Commissioning	The process of making a smoke detection system operational.
D	Disable	Disables the alarm relay outputs from actuating (previously known as Isolate) and indicates a fault.
E	Event Log	All VESDA detectors provide internal data logging of events which have occurred in the protected zone.
F	Fire	This indicates a serious situation and may lead to automatic generation of a normal fire alarm.
	Fire Alarm Control Panel (FACP)	A panel which all fire detection products report their status to.
G	General Purpose Input (GPI) Unmonitored	An input to a detector which can be used to place the detector in a certain condition. Applying a voltage between 5V and 30VDC triggers the selected condition.
	General Purpose Input (GPI) Monitored	An input to a detector which is monitored for open or short circuits. It can be used to monitor the power supply.
H	High Airflow Environment	Where there are 10 or more air exchanges per hour.
	High Level Interface (HLI)	A communications interface between a VESDA device and other pieces of equipment using VESDAnet or another communications protocol.
O	Obscuration	The reduction in light transmission per meter or per foot due to the presence of particulates.
R	Referencing	A technique in which a detector is set up to provide measurements of background smoke level. This reference level is then subtracted from the readings of detectors in the protected area to avoid nuisance alarms resulting from background pollution.
	Relay	A device on a detector which allows external equipment to be hard wired to it and be triggered when various conditions occur (example, sounding a siren at Alert threshold).
S	Sampling Network	The pipe network constructed to allow the VESDA detector to draw air for sampling.
	Sensitivity	Degree of response (i.e. activation of alarm condition) of a detector. A high sensitivity denotes response to a lower concentration of smoke than a low sensitivity.
Z	Zone	A defined area within the protected premises from which an alarm signal can be received.

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